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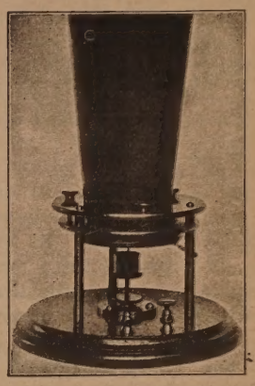
THE NEWSPAPER FOR
THE HOBBYIST OF VINTAGE
ELECTRONICS AND SOUND

THE HORN SPEAKER

TELEPHONE CENTENNIAL
1876 - 1976



RADIO-CRAFT August, 1931

Recording Equipment and Its Operation

A review of types of commercial apparatus designed for "instantaneous" recording of sound on discs

By GEORGE J. SALIBA, S.B.

WHENEVER a new art, still in its embryonic stage, is introduced to the public, the development and perfection of that art lies with the amateur who is willing to spend without stint both time and money to satisfy his desire to achieve results in a field which is considered very technical. But he is, usually, handicapped at the outset of his quest by inability to find and procure the proper apparatus with which to conduct his experiments.

And home (or, as it is now known in the trade, "instantaneous") recording, a comparatively new development in the associated fields of acoustics and electronics, seems to be passing through just this dark stage; since the writer finds that, judging by the letters elicited by previously published articles*, enthusiasts of this art are experiencing inability to obtain the necessary materials with which to carry on their work.

Today the handicap is due largely to the fact that manufacturers of home recording equipment are averse to advertise extensively; not yet realizing the magnitude of this relatively new and interesting field or the interest that has been aroused by previously published material, and the repercussion—its application.

Since this equipment is usually a side-line, it is the amateur—the one who should be given every possible aid—who is made to suffer. To sweep away this curtain of secrecy, it is the purpose of this article to describe in considerable detail, and with an eye to their practicability, some of the equipment now available on the market.

A Modern Recording Machine

A particularly interesting recording machine (Fig. A) is manufactured by G. J. Badgley & Co. While intended for use with blank ungrooved records, such as aluminum, it can be used also for blank pregrooved records simply by adding an ordinary phonograph pick-up equipped with the proper weights. The turntable motor M is of the commercial phonograph type; slightly modified in order to drive the cutting head CH across the face of the record.

The gear box GB contains two helical gears which transmit motion to the driving shaft D, which has a pulley mounted at one end of it. This pulley P1 drives, by means of the rubber belt B, the top pulley P2, which is mounted on the feed screw FS. This feed screw has 64 threads to the inch; but the feed screw-turntable gear ratio is such that 96 lines to the inch are cut on the record.

To give rigidity to the motor, the spider S upon which the motor is mounted is made very long; and it is separated from the mounting plate by means of rubber cushions or washers W, to prevent motor vibration being transmitted to the turntable.

A threaded clamp C is used to prevent slippage of the record during recording. This clamp is purposely made with a *left-hand* thread to offset any tendency of the turntable, driven in the right-hand direction by the motor, to loosen it.

The weight on the recording head can be varied by sliding along the weight-rod A, the weight B1. The rod also is movable, so that the weight can be made to hang directly over the cutting head if necessary. This head is guided across the face of the disc, by means of a half-threaded coupling which is kept in mesh with the feed-screw by means of a spring contained in the spring housing SH. A very unique feature of the apparatus is the plunger P.

The motor, although it has enough torque to make a twelve-inch record, has a difficult time starting with the cutting head on the disc. Now, by the use of the plunger P

(Continued on page 3)

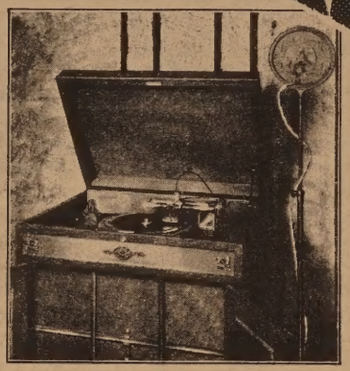


Fig. B

A studio-model recorder; the reproducing pick-up is at the left of turntable.

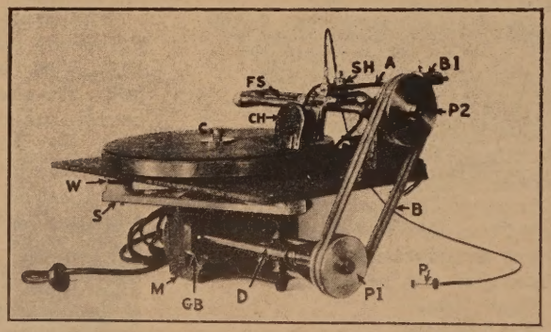


Fig. A

Detail of the recording unit shown in Fig. B; it will operate on plain or grooved discs. A special recording head must be used for the latter. The plunger P is used to give great accuracy in raising and lowering the head. The components and their functions are described in the text.

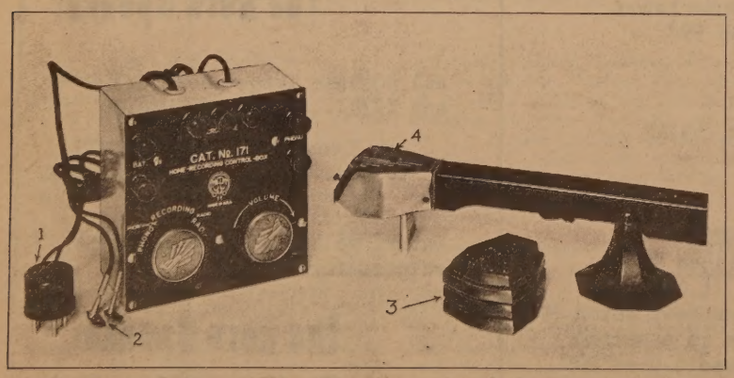


Fig. C

This apparatus, with a microphone and its battery added, is designed for permanent attachment to a receiver, for recording and reproduction. Adapter 1 and lugs 2 connect, respectively, at the detector and power stages. The pick-up-recorder 4 is loaded with the weights 3, as required.

* The author refers to his articles, "'Instantaneous' Recording of Sound on Discs," in the June, 1931, issue of RADIO-CRAFT, and "How to Improve the Quality of Radio and Personal Recording," in the succeeding July issue. See also the article, "Home Recording of Radio Programs and Speech," in the December, 1930, issue.—*Tech. Ed.*

RADIO-CRAFT
February, 1932

HOLLIS BAIRD ON "TELEVISION SETS"

"WITH the present high state of refinement of tone in the modern broadcast radio receiver, anyone who delays purchasing these remarkable instruments at their present extremely low prices with the idea 'they will wait' until television brings them a receiver for both sight and sound are neglecting a great opportunity. We, for one, haven't the slightest intention of putting out such a combination set for many years.

"The great television market comprises those people who have been visionary enough to invest probably $150 each in first class radio sets and enjoy them. These will be ideal only for receiving the *sound* programs from the studios that send out pictures; now we want to build *television*, not sound, radio sets.

"Television and sound radio are two distinct subjects, two arts, and the only thing related about them in the future will be that the programs will emanate from the same studio. From that point the connection ceases. The sound part of the program will go out over the present broadcast waves and be received on the present type of broadcast set. The picture part of the program will leave the studios by way of entirely different apparatus, go out over a wavelength entirely separate from the broadcast band, demanding a completely different receiver for its reception. Thus in the home the sight and sound entertainment will be two distinct features.

"Since this is so, why should we want to build up *sales resistance* by incorporating a broadcast set in the same cabinet with our television set, two distinct sets merely housed together, and then have to charge the extremely high price this combination would demand, at the same time, asking our prospective customers to get rid of their existing and highly satisfactory broadcast sets at a loss? The idea is too ridiculous for any thinking person to seriously consider.

"Then again, we know that the broadcast receivers, having changed so little during the past year, merely refinements, have become a stabilized product. But television, as good as we may be able to make it this year, will have to have a ten-year period of development even as has sound broadcasting and at the end of that time the television receivers will probably be quite different from the very best ones we will sell during the next three years.

"Thus to sell a television receiver in a cabinet with a broadcast set and then find television changing after a few years, yet the broadcast set as good as ever, would certainly not be wise and would necessitate the junking of a perfectly good broadcast receiver

(Continued on page 3)

FIND OF THE MONTH

I have to boast just a little bit about a couple of my recent finds. I picked up an Atwater Kent model 10 at a farm sale in South Dakota. Would you believe 35 dollars?? And also a Radiola III without the tubes (naturally). The A-K 10 is in beautiful condition & works like a champ, the Radiola III is in good condition but I haven't got it going yet. I've tried to use 99 tubes in it with some success but I still haven't got it completely right. Do you anticipate any articles on this radio? The terminals on the right side of the face panel have me somewhat stumped. I've got the antenna & ground straight but the other numbered terminals & the movable jumper are a mystery.

Thank you,
Jim Steele

Ed.—we anticipate an article on this radio but an immediate answer to the mystery is welcome.

LETTERS

EDITOR'S MAILBAG

Dear Jim:

Regarding your little note in the December Horn Speaker: Atwater Kent made battery-powered fans, small dynamos for gas-engine ignition, and telephones, as early as 1899. Illustrations of some of these items have been reprinted in recent issues of the Indiana Historical Radio Society Bulletin, taken from old issues of The Electrical World. The Kent Electrical Manufacturing Co. was located in Worcester, Mass., where Kent attended Worcester Polytechnic Institute, and about 1900 moved to Philadelphia. Kent's advertising in 1899 intimates that he had been manufacturing various electrical items for several years prior to 1899, but that seems unlikely since he was at Worcester Tech at the time. He didn't make it past his sophomore year, by the way.

Cheers,
Alan S. Douglas

Dear Jim:

Enclose check for to renew my subscription to The Horn Speaker. Hope I have not missed any copies by not renewing earlier, but it came at Christmas time and kinda forgot to send for it.

Enclose a copy of The Voice of the Air. I found several of them in a box of old tubes and radio catalogs I bought in Kentucky, this past summer while attending an old threshermans show. Besides radios I collect old gas engines. I also found a real good Radiola III last summer, but need tubes for it. Will order some VT-24/864 from Brent Dingman in California.

Best regards and keep up the good work with The Horn Speaker.

William Cunningham
4335 Barker St. S.E.
Washington, D.C. 20019

Dear Mr. Cranshaw:

I am enclosing a check for $4.50 for a subscription to The Horn Speaker. I started collecting old radios about twelve years ago, back when they were given to me. I have an Atwater Kent several console Zenith s and several Philcos, all from the 20's and 30's, except for one Zenith that is a 1941. I am missing the turntable on it. The radio is an upright console and quite large, standing about 4 feet high. It is at my parent's house in Washington State, so I do not have a model number. Any idea of where or who I might get a turntable from, or the type I need?

I also have a Mohawk-American radio with a detatched speaker. I have never been able to find out when they were made, or by whom. Any information from you or any of the readers? If this is classified want ad material, I will put an ad in as soon as I can find out what I have. Any information, however, would be appreciated. I also collect old Edison cylinder and Diamond Disc machines.

Sincerely,
Steven Benham
College of William and Mary
Department of Geology
Williamsburg, Virginia 23185

Gentlemen:

Please send a copy of "The Horn Speaker" as per Audio News in the July 1974 Stereo Review.

I am needing a new mainspring for a table model Edison Amberola; if the magazine does not list some source where mainsprings are available perhaps you can help me.

Thank You,
Don Sheldon
220 Le. Mont
St. Helens, Ore. 97051

Gentlemen:

Any information, such as year, what its worth etc, about the following radio would be appreciated. RCA Radiola 66, model #AR 598.

Thank you,
Danny Dean
Rt. #2
Carroll, Ohio 43112

FOREIGN VINTAGE SETS

Tudor Rees in his Antique Wireless Newsheet No. 5 had 18 listings of radio stock. The newsheet which contains some news items is supplied free to enthusiasts of radio pre-1945 upon receipt of one self addressed envelope per issue (U.K.) or cost of postage overseas. For more information contact: Tudor Rees (Vintage Services), 64 Broad Street, Staple Hill, Bristol BS16 5NL, Great Britain.

A Marconi, Pye, McMichael, Cossor, Philips or Ekco radio would add interest to your collection. One of the Philips sets is dated 1929.

The Newcomer

THE HEART OF THE RADIO CIRCUIT----
THE VACUUM TUBE
By O. H. McDonald

As I mentioned several months ago I would go back into yester-year in explaining the functions of some basic radio circuits and parts. I found the explanation of the diode vacuum tube was the easiest to cover and this greatly helped in explanation of the triode. The diode is the simpliest of the vacuum tubes consisting of a filament and a plate. The triode consisted of the addition of the grid, which will be covered in the next article.

The function of the filament is to generate a flow of electrons. This filament is a tungsten wire similar to the filament of todays' light bulbs only these have been coated with a metal which will readily emit electrons when heated. These coatings were usually thorium or barium.

The battery used to heat the filaments are the 'A' batteries and this heat causes the filaments to boil off electrons much as steam is boiled off of water. As the electrons are boiled off of the filament they began to fill the vacuum of the tube. If a positive charge is placed on the plate with respect to the filament where the electrons are leaving, the plate will attract these electrons. This is shown in the drawing.

(Continued on page 4)

BACK ISSUES
The Horn Speaker

All 20 back issues for 1973 and 1974.....$10.00

Any issue from January 1973 to now.....50¢ea.

Later, we should have complete volumes for 1972.

The Horn Speaker
Box 12 Kleberg, Texas 75145

the following procedure is carried out: While the motor is at rest, the cutting head is placed at the "start to record" point on the blank record. The plunger is then pushed, and the cutting head now may be raised from the record by pushing in plunger P; after which the motor may be started. When it has reached normal recording speed, the plunger is released, thus replacing the recorder on the record.

This machine cuts a good, even groove with no apparent "line periodicity" (uneven spacing—not uncommon in some makes); and it is especially adaptable for studio work.

Fig. B shows the complete studio recording apparatus utilizing this machine. It must be remembered that excellent results are obtainable only when a good two-button microphone and a good three-stage transformer- or resistance-coupled A. F. amplifier are used. The standard impedance of the cutting head is in the neighborhood of 4000 ohms; however, it is obtainable with a unit of any standard impedance.

The cabinet contains, for recording and playback, a complete amplifier and current-supply system, consisting of two stages of A. F. using type '27 tubes, and a power third stage using push-pull '45's; the rectifier is an '80. An indication of the sound level at which the recorder is working is given by a dynamic reproducer contained in the cabinet. The microphone, of course, must be isolated in another room of the studio suite. (The design of this assembly is in accord with the specifications which appeared in the previous article, in which, particular attention should be given to Fig. 4, pg. 29.—Tech. Ed.)

The Recordovox

The Pacent Model 171 "Recordovox," shown in Fig. C, is made especially for home recording, to use only pre-grooved records; this instrument does not record on non-grooved metal records. Besides making the records, it reproduces them as well; and, once this apparatus is connected to the radio receiver, it need never be removed.

In order to use the "Recordovox," a radio set, turntable and microphone are needed. To use a single-button microphone, only two connections are made, to the center post and either one of the outside posts marked "microphone"; and a 4½-volt "C" battery is connected to the posts marked "Batt.". If a two-button microphone is used, connections are made to the three microphone binding posts; and a 6-volt battery is required.

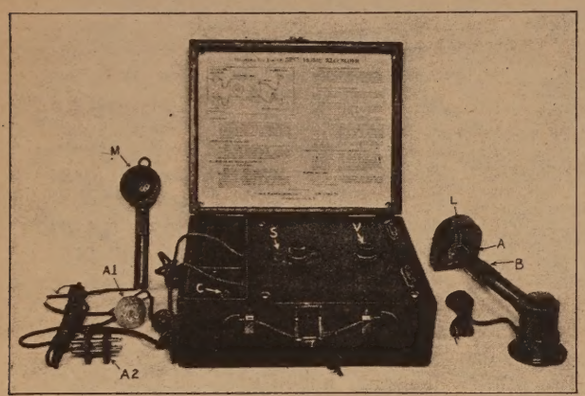


Fig. D

The Best Home Recorder; left, microphone M, with adapters A1 for connection to the input, and A2 (two plugs) for the output of set; C is a cap for use with a screen-grid detector; S, switch; V volume control. The pick-up, at right, is described on page 118.

The recording head is connected to the terminals marked "Phono." The five-prong adapter 1 (connected by a cord to the control box), is inserted in the detector socket of the radio set, and the detector tube is placed in the adapter. The single-prong adapters 2 (furnished with the instrument), are placed on the plate prongs of the two output tubes; which then are replaced in their sockets. The remaining cord from the control box plugs into the receptacles incorporated in these adapters. This completes the installation. For radio reception only, the selector switch is turned to "Radio," and the set tuned in the regular way; and to record a radio program the selector switch is set at the "Recording Radio" position.

The turntable motor is turned on, a home-recording needle is inserted into the recording head, and the latter is weighted with one or more of the weights, 3, (supplied with the kit.) The radio set is then tuned to the station whose program is desired for recording, making sure that the volume control is at a fairly high level. Best results, of course, will be obtained with all three of the weights; but, very often, the phonograph motors available do not have sufficient torque to pull the turntable around when the head is thus weighted, and a lesser number must be used.

When it is desired to make microphone recordings, the volume control of the radio set is turned to the position for minimum volume. (If a signal still is heard, the receiver must be detuned.) The selector switch on the control box is turned to "microphone recording," and (after the cutting head is set as described above), the apparatus is ready for the recording.

The microphone, if of the single-button type, should be held in a true vertical position and about one inch from the lips of the speaker, who should use a tone slightly louder than ordinary conversation. If squealing is noticed, the microphone should be kept away from the loud speaker. In fact, for best results, the microphone should be in a room separate from the radio set and with the intervening door closed.

On playback, the previous instructions for detuning the radio receiver and setting the volume control at minimum volume are followed; and the selector switch is set to the "Phono" position. The volume of the record reproduction is regulated by means of a knob on the control box.

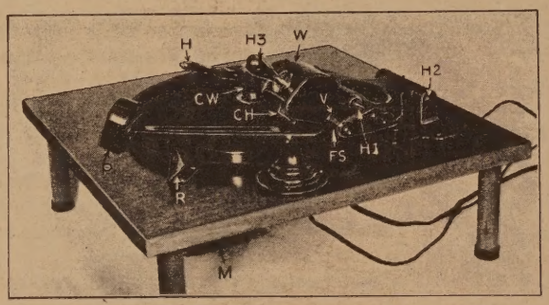


Fig. E

Set-up of the new Presto home recording kit; shown in recording position.

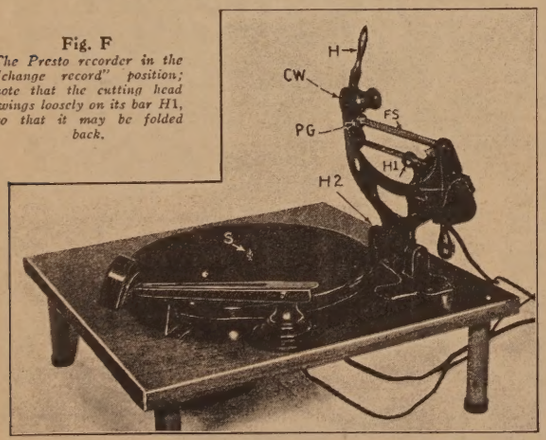


Fig. F

The Presto recorder in the "change record" position; note that the cutting head swings loosely on its bar H1, so that it may be folded back.

To reproduce, with the equipment shown, the cutting head is turned back on H1, and the pick-up P, here shown in its rest R, is placed on the record. CW is clamped to the motor's spindle S and drives the feed-screw FS.

New Best Apparatus

The Best Manufacturing Co's. recording apparatus, shown in Fig. D, is very similar to the "Recordovox" except for the method of weighting the recording head, which is very ingenious. No external weights are added to the recording head. When the unit is to be used for recording, the lever L is pushed over to the side marked "R," locking the recording head and preventing it from swinging about a joint A. For reproduction, the lever is moved to position "P," and motion takes place at joints A and B. The balance of the recording head is such that, when its weight is fully applied to the record, it exerts enough pressure to make a good recording. This novel method of increasing the effective weight of the head possesses an advantage in that no weights are required; at the same time, it has the disadvantage that, should the turntable motor develop insufficient torque to pull the record at a constant speed, because of the great weight of the head, a poor recording will result. Under this condition, the lever is dispensed with, and weights are substituted to mount on top of the recording head. The method of installation and operation are the same as described for the Pacent unit.

Late Model Ungrooved-Disc Recorder

In Fig. E is shown the newest development in the way of home recording equipment, of Presto Machine Products, Inc. In this one kit are contained all the mechanical units (cutting head, feed-screw, worm, worm gear, etc.) necessary for recording on blank ungrooved discs. This entire mechanism is so constructed that it can easily be lifted from the turntable, for changing records, by simply pulling upward a handle, H.

Installation is very simple. The only requirement is to fasten the plate to the motor-board, first making sure that the clamp-worm CW will couple easily to the spindle of the turntable when the handle H is brought down. The clamp comprises a double-thread worm that is driven by the spindle of the turntable. This worm meshes with a pinion gear (PG, Fig. F) mounted at one end of the feed-screw shaft FS. This screw has 12 threads to the inch; the threads being of the "buttress" type. Since the ratio between the worm and pinion gears is 8:1, and the feed-screw has 12 threads to the inch, the number of lines per inch that will be cut into the record will be 96.

The cutting head is weighted with a 3-pound weight, W, the bottom of which is recessed and lined with leather at V, so that it will mesh in noiseless and proper manner with the buttress thread of the feed-screw.

The Presto recorder is supplied in kit form; and contains, besides the cutting unit, a control box, microphone, microphone pre-amplifier, using a type '27 tube, pick-up and turntable. The operation of the control box (not shown here, but illustrated in the June issue) is similar to the above-mentioned control boxes, except that when the knob is turned to "Phono," the phonograph pick-up is cut into the circuit.

The cutting mechanism can be used with either the Pacent "Recordovox" or the Best control box, by simply inserting the recording head leads into the receptacles marked "Phono." It must be borne in mind that this unit is not suitable for the playback; and, when the latter connection is desired, it is necessary to remove the recorder leads and substitute pick-up leads.

This about completes the description of the home recording equipment now on the market. There are many other phases, of this fascinating and rapidly growing offspring of the radio and phonograph arts, which so far have not received the attention of any books or magazines. In due time, the writer will consider each of them in their proper sequence. Meanwhile, if there are any questions in the minds of readers of this department (A huge stack of mail attests that there are—varied and numerous.—*Tech. Ed.*), answers to them may be obtained by writing, enclosing a *stamped return envelope*, to the attention of the Sound Recording Department of Radio-Craft.

Baird

because it happened to be housed in the same cabinet with the outgrown television set.

"No, indeed. We intend to make television a very separate thing from broadcast reception, a separate machine. As a separate receiver it can be changed as the passing years improve television. The sound will be coming in over the present highly developed broadcast sets during that time."

article coming
Rejuvenate Old Tubes
by
O. H. McDonald

1931 ad

MUSIC MASTER Model "PETITE"

110 Volt A.C. 50-60 Cycle
THE SMALLEST
17" x 13" x 7½"
THE LIGHTEST
Net 18½ lbs. Ship'g. Weight 23 lbs.
THE MIGHTIEST
in performance.

That, briefly describes this NATIONALLY and INTERNATIONALLY FAMOUS Midget Receiver. Made by a well known manufacturer. FULLY GUARANTEED to us and by us.
The chassis is a masterpiece of compact radio engineering, sturdy, clean construction. Uses three 224 screen grid, one 245 Power and one Rectifier tubes, Loftin-White amplification, Electrolytic Condensers, Magnavox or Jensen Dynamic Speaker, and all housed in a beautiful Walnut Veneer Cabinet of graceful lines.
The manufacturers' price is $49.50 less usual trade discount.
OUR NET PRICE $25.45
Optional: A set of good tubes supplied with each Receiver at $1.25 additional. Convince yourself of the tremendous value of this offer. Order samples at once, examine and test them, your order for as many as you can handle will follow quickly.

YEARS OF RADIO

MY FATHER IN EARLY RADIO INDUSTRY

By Lawrence Beitman

Additional nostalgic reminiscenses about Morris N. Beitman's long career as an engineer, inventor, teacher, author, and mainly as the Mr. Diagram. He is still around, active in his firm, Supreme Publications, and supplying diagrams at what today passes for reasonable price. (They were 25¢ each in the early 40s.) As in the case of the previous article published in the September issue, this material was submitted by his younger son, Lawrence, a senior at the University of Illinois.

1937 RADIO CATALOG
Allied Radio
Newest Amateur Equipment at Lowest Prices
You'll find everything you need in ALLIED'S big new 1937 Catalog! A tremendous assortment of transmitters, receivers, transceivers. Dozens of new Kits for Set-Builders—new DX-er, Knight

Out of radio servicing after "high school hours" and "making money" in Public Address equipment rental while at college, my father "became" a radio engineer in the late 30s. Along the way, he started the first kit department at the old Allied Radio in Chicago, and was the major figure in the developing electric fence control equipment. I will try to tell his interesting recollections of early radio with a sense of humor that may bring a chuckle to the reader.

Some months back my father's early radio experiences and work were described in these columns. Back in the 1920s, while still a freshman at high school, he was already repairing radios, and in the last article we took him along to his early jobs in industry and the first technical writings. This was not the best of times to enter the job-market (then it was the real depression), But my father paraded his many magazine articles and the pamphlets he already published and applied for jobs everywhere. For a time, he made laboratory measurements on new models at Howards Radio (still listed in Supreme and Rider's, but out of business for decades) and worked on sound equipment at the old DeVry which was an important supplier of movie projection equipment. The places where he "almost got a job" would read like the who's who of the old radio industry. He had interviews with Mr. Siegel of Ohmite, for whom a very large building at Illinois Institute of Technology is named, Mr. Schmidt who started Amphenol, Mr. Gibson who at that time had a firm with his own name and was working on timing devices (not guitars), and many, many more. To this day, my father insists that he was not hired by the old Montgomery Ward (they had a large radio parts department) because his first name was Morris, and probably this is when he started using M. N. Beitman as his name on all his publications and magazine articles. Anyway, the real start in industry began with Standard Transformer where, in a few months time, he turned a number of things up-side-down and made a real contribution to test proceedures.

In those days, Stancor was mainly involved in making exact replacement transformers and a regular line of power transformers for the industry. The exact replacements were easy if the original factory units were also supplied, but if not, a sample would be secured, torn down, wire measured, turns counted, and a design worked out from stock laminations and hardware to match the original. Leads were of the same color, terminals, if used, were matched and placed in the same positions. This whole proceedure was slip-shot and was put on a real production method by "you know who." The testing was performed by actually connecting test leads and reading a meter. Almost before the girls in the factory doing the testing learned that there was a new engineer around with curly hair and a nice smile, they were using new, hand made, test devices. These units had jigs to match transformers in production and patch cords to set up the test proceedure. The actual contacts were controlled by flipping switches, but MNB was working on a motorized model which would make all tests in one automatic swoop. All this may sound simple in the present day technology, but it was revolutionary at the time. Meanwhile, Walter Marsh, who at that time was the general manager of Allied Radio, but years later was a sales rep and among other lines sold my father's books, was daily calling my father with promises of a great career at Allied and five dollars more per week. Soon we find MNB handling mail sales on public address at Allied.

The work at Allied lasted a long time by the standards of job-hopping that my father had. Here he learned a great deal, gave the industry his share of innovations, and made some lasting friendships. He worked with D. L. Warner, who was a most outstanding ham operator and later had a sales firm of his own. Another Warner's name came to my father's recollection as he related these facts. This Warner was a pioneer in developing early photo-cell equipment and I will pick up another

(Continued on page 6)

NEWCOMER

In tracing the flow of electrons, with the filament lit, the electrons leave the negative side of the 'B' battery and travel to the filament where they are boiled off. The positive plate attracts and the electrons go to the plate and travel through the milliampere meter back to the positive side of the 'B' battery. This plate current flows as long as the circuit is complete. However if the filament should burn out, the boiling off effect would cease and no electrons would cross to the plate. If the 'B' battery should be reversed, the current would not flow since the negative plate would repel the electrons from the filament. The electron will not leave the plate since it is not heated.

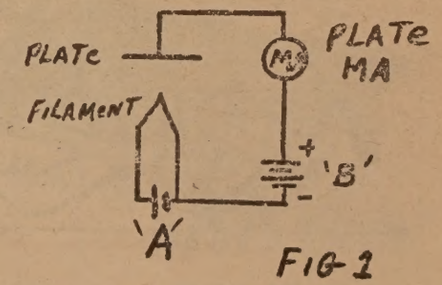


FIG-1

Now if an alternating voltage is put in place of 'B' battery, the plate current will flow only half of the time. As the plate voltage goes more and less positive, the current flow varies accordingly because the plate attraction varies. The plate current will not flow at all on the negative half of the alternating cycle. This effect was put to use in the early all electric power supplies and the battery chargers even back in the teens.

Continued next month --Please keep writing.

Columbia Grafonola

They Meet Where There's Music

That's where the young folks flock of an evening. In every neighborhood there's some hospitable home where the Columbia Grafonola attracts guests like a merry musical magnet.

Right well they know where they'll hear the latest po songs, and dance to the newest waltzes and jazzes. pure, brilliant tone of the Grafonola makes it the ideal ir ment for the informal dance or party. The best music, the fun, and the best dancing are always waiting to welcome g in happy homes made musical by the Columbia Grafo

To make a good record great, play it on the Columbia Grafonola

COLUMBIA GRAPHOPHONE COMPANY, New York

London Factory: 102 Clerkenwell Road, E. C.

MY FATHER IN EARLY RADIO

story of this in the next paragraph. George Pettit, who later had a big sales rep firm, set close to my father at the big open office Allied used. And so did Sanford (Sandy) Levy who is now the main owner of EDI. With the coming of L. M. Feiler to Allied, my father gladly gave him the public address work and took on full time the growing kit activity with which he was already involved. Feiler is still my father's close friend and is now at Zenith. You perhaps remember him from the days he made test equipment kits (Stetoscope, etc.) and wireless intercoms.

But back to Warner and photocells for the moment. One of the first commercially made units was designed and manufactured by Warner, but he did not make any light source at that time. In one afternoon, my father, as he tells this, obtained the sources and samples of an electric outlet box and fittings, a piece of pipe, a cheap lense, and assembled what resembles a modern light source. If you have a 1938 Allied catalog, it is probably listed there. One of the first sales of this equipment was to a Chicago night spot operated by someone who does not like mistakes. The installation worked fine in opening the entrance door until the evening hour and was a great novelty in that period. When the guests began to arrive, Warner found himself on a perch above the door, out of sight, pressing an electric switch to open the door for each incoming guest who in turn marvelled at the new photocell application. Of course, this was a small problem compared to Farmer Brown's sensitive cow that died from a "heart attack" because of an electric fence shock.

My father was involved in the design and application of fence controls almost from the day of the application. He worked on models using an old automobile radio vibrator to produce high voltages, and continued with models with double relays (Originally made by Gardner, a manufacturer of relays), and rolling ball model on moving incline plane. What happened to all these old models?

Let's get back to kits to end this installment. It was common for radio and mechanic type magazines to describe radios and other electronic equipment and readers could build. Little was given in the article to help in the construction except the schematic and some hints. At first my father (still at Allied) became involved in simply providing a parts list, of course, with Allied numbers and prices. He was very good at this work, never missing an item. For example, he would include when needed a grid cap at 1¢, hook up wire, stand-off brackets, and a six prong socket for a type 42 tube, and a five prong for a 76. This was good profitable business, and soon he was making his own kits, writing them up, and selling the articles to every magazine around. This was more business to Allied and good publicity besides. In this small way, Allied's kit business was started.

My father's stay at Allied was interrupted with his leaving (for more money, of course) to work at the old Lafayette Radio (Radio Wire Television in Chicago) and for the senior W. C. Braun at Radolek. But he returned to Allied, again for more money, and stayed until he took a full time teaching job in Chicago high schools, to be followed by full time activity in Supreme Publications.

COLLECTING
IS
FUN.

Club News

INDIANA HISTORICAL RADIO SOCIETY

The next meeting of the Indiana Historical Radio Society will be held on Feb. 28, 1976 at Ivy Tech, 1315 E. Washington St. in Indianapolis, Indiana.

This is planned to be the first annual mid-winter swap-meet and flea market of old electronic gear. Every one attending is urged to bring something to sell or trade. The more the better. Short business meeting and the rest of the time for goodies. See you in Indy!

BOOK REVIEW

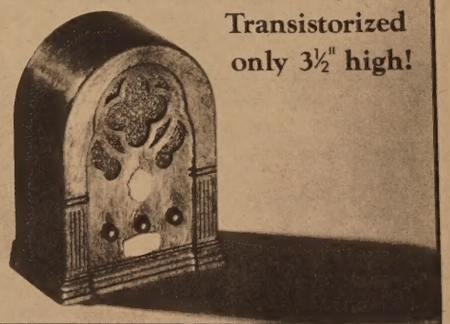
"THE STORY OF NIPPER" Nipper, the loveable little terrier who for years was one of the World's most familiar trademarks - of "His Master's Voice fame - was a dog owned by Francis Barraund, an English painter. This fascinating 7½X9½" paperback tells how the artist concieved the idea for this famous painting: how the idea was promoted, and how years later attempts were made to exhume the bones of this pretty little animal! Well illustrated. $3.50 available from Vestal Press, P.O. Box 97, Vestal NY 13850.

Contributed by Ed Taylor

1976 ad

you'll have fun with this....

Old Time Radio



Transistorized only 3½" high!

OLD TIME TRANSISTOR RADIO

ONLY 9.90 Postpaid

Remember the good old days . . . when everyone sat around the parlor listening to the radio? This is a miniature copy of that famous cathedral-style old-time radio and measures 3½ x 1½". Our model has five transistors and two diodes and comes in handsome woodgrain plastic case. A wonderful piece of nostalgia. Uses one 9-Volt battery which is included. Each comes gift-boxed.

WALTS EMPORIUM

P. O. BOX 19406 DALLAS, TEXAS 75219

EVENINGS - 214-262-7855

GREAT THINGS ARE HAPPENING IN THE SOUTHWEST VINTAGE RADIO AND PHONOGRAPH SOCIETY

Arkansas, Louisiana, Oklahoma, Texas and New Mexico.
Write for application: S.V.R.P.S., P.O. Box 19406, Dallas TX 75219.

MART

Classified ad rate: 6¢ per word.
Photo ads: $2.00 extra.

MISC.

PHONOGRAPH COLLECTORS, join the American Phonograph Society. Receive the quarterly Journal and four Newsletters. Receive free reprints and stereoscopic phonograph cards. For more information send 10¢ stamp. For one year membership, send $6.50. The American Phonograph Society, P.O. Box 5046, Berkeley CA 94705.

FOR SALE OR TRADE

FOR SALE: Edison receiving unit type R, SF #748223, Edison cabinet factory #18, Pat. #1674603.
Philco Radio Superhetrodyne Model #112, 115Vac, 50-60cy, 105 watts also pat. #11785114-1875 Hozetinelatour Corp. Cabinet by Desi Norman Ceddes. Will send pictures of front and back to interested parties. Will sell to highest bidder. James F. Smallwood, 12414 Military Road So., Seattle, Washington 98168.

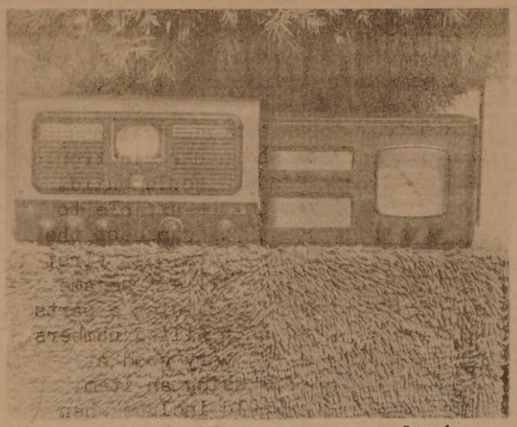
BLANK BAKELITE STOCK cut to size, 1/8" to 1/2" thick. Fabricating and engraving services available. SASE for pricing sheet.
Norman A. Parsons, 22 Forest St., Branford CT 06405, Phone: 203 488-4267.

CLOTH COVERED POWER CORD: New 2-conductor cord as used on AC sets of the twenties, thirties, forties. From old stock, limited quantity. In brown or gold 25¢/foot. Please add 50¢ for mailing. Warren Dewey, 5021 Ambrose Ave., Los Angeles, California 90027.

SEND SASE for list of battery radios. Marconi original stock certificates $10.00 each.
Paul Giganti, 2429 San Carlos, San Carlos, CA 94070.

RADIOS FOR SALE: Grebe, Federal, Crosley, etc., some new, never used, All MINT condition. Roland Matson, 388 Concord Road, Bedford, Mass. 01730. Phone: 617 663-3877 after 5 pm.

FOR SALE: Many early battery and electric radios. Write your needs. Radio Americana, Box 128, Woodstock N.Y. 12498.



FOR SALE: Pilot 3" Television $275. RCA Radio $60.00. More radios. Many televisions from 1930s - 1940s. WANT horn phonographs, old radios and televisions. Charles Seidel, 614 Grove Lane, Santa Barbara CA 93105. Phone: 805 687-7967.

SPEAKER GRILLE CLOTH. Two new styles now available. (Styles #1, 2, 3 sold out.) Fine, silky 20's - 30's style fabric. 24" wide $4.00/yard, plus 25¢ mailing. SASE for samples. Warren Dewey, 5021 Ambrose Ave., Los Angeles CA 90027.

FOR SALE OR TRADE: Early QST's, CQ's, Radio, call books, handbooks, tubular Audiotrons, Electron relays and early receivers & parts. Erv Rasmussen, W6YPM, 164 Lowell St., Redwood City, California 94062.

SALE: Sparton 6-15 $25., Kolster 6-D $25., Sonora AM/SW $35. Crosley Dynacone Speaker $20; RCA 100A speaker $20. Shipping extra. Al Mackenzie, 1625 Hillandale Rd., Columbia S.C. 29206.

FOR SALE: Old radios; speakers; tubes; books; magazines; test equipment. Send large SASE and 50¢ in stamps for lists. Krantz, 100 Osage Ave., Somerdale N.J. 08083.

RADIOS FOR SALE: Specify your needs or send $1.00 and SASE for list. Refundable. Radio Americana, Box 128, Woodstock, N.Y. 12498.

WD11 Adaptors, use UX199, 120, VT24. No wiring changes, Radiola III's battery hook-up included $5.25 pp., 2 for $9.25. Keith Parry, 17557 Horace St., Granada Hills CA 91344.

SEND $1.00 for the newly published booklet "A Pocket Guide to Antique Radio Collecting." Antique Radio Press, Box 42, Rossville IN 46065.

Miscellaneous

DON'T DIE without a WILL! Blank will form protects your family. Only $2.00 guaranteed. Order today! COE Enterprises, Box 259, 75 Coe Dr., Mesquite, Texas 75149.

WANTED

WANT: National power supplies #5897 and 5880. Also need metal cabinet for Federal DX 58. Want coils for FB7 and National SW3. Want DeForest audion (spirical) and multivalve tube. Picture and data on Baby Emerson. Want loop for DeForest D12. RCA service notes for 1937. Doak, 45 Allen Dr., Woodstock N.Y. 12498.

WANTED: David Grimes INVERSE DUPLEX Radio Model 4DL. This is a reflex battery radio - "Radio News" magazines - 1925 and earlier.
J. Albert Warren, Box 279, Church Street, Waverly PA 18471.

WANTED to buy horn phonographs, gramophones, hexaphones, music boxes, violanos etc., working or non working. Larry Dupon, 616 W. Surf St., Chicago, Ill. 60657. Phone: 312 227-1658.

WANTED: Karlsen inclined sounding board enclosure for 15 inch speaker, schematic for Crosley 146CS all-wave .550 to 18MHz and 200-300MHz FM. Monroe Penick, 509 St. Johns Dr., Sherman, Ill. 62684.

WANTED: Will pay cash for collections of Phonographs or Radios. Need any printed material, catalogs, etc. on Phonographs or Radios. Bill Truesdell, 1022 Briarcliff Road, Monrovia CA 91016.

WANTED: Scott, McMurdo Silver, Lincoln receivers, also paper work on same. J. Cunningham, 23 W. 675 Ardmore, Roselle, Ill. 60172.

WANTED: 1939 Scott Philharmonic, McMurdo Silver Masterpiece VI. Both in good condition.
Dick Nelson, 20962 Itasca St., Chatsworth CA 91311.

WANTED: Crystal sets, battery and electric radios and televisions Mfg. before 1935. Need all related items. Will buy one set or complete collection. Young, 11 Willow Court, Totowa, N.J. 07512

WANTED: Radio - all 1920, 1921, Oct. 1922. Many wireless age 1920, 1925, Q.S.T. Feb., March 1920. Radio Craft Aug. 1929, Feb. 1931. Thompson, 2930 Delavina, Santa Barbara CA 93105.

WANTED: Crosley Pup and Browning Drake Model 5R. State price and condition in first letter.
E. Drake, Box 38, Raynham, Mass. 02767.

WANTED: Federal 61 cabinet or junker, Westinghouse (RE-AR), either component with or without cabinet. Silver Marshall plug in coils, 111E & 110A. Wayne Wright, Pocahontas VA 24635.

WANTED EARLY MORSE KEYS ANY TYPE, condition and other pre-1935 gear. Op. A. Shawsmith, 35 Whynot Street, West End, Brisbane, Q. Australia 4101.

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P.O. BOX 28572 DALLAS TEXAS 75228

PUBLISHERS OF

THE CLASSIC RADIO NEWSLETTER

LIST NO. 14

HOW TO ORDER

(1) Make checks and money orders payable to PUETT ELECTRONICS.

(2) Please state whether new or used tubes are desired and whether a half-price used tube is desired when a new tube is out of stock. REFUNDS are mailed with your invoice for out-of-stock tubes, or when, by customer request, a used tube is substituted for an out-of-stock new tube.

(3) ALL ORDERS ARE SHIPPED PARCEL POST. NO C.O.D. INCLUDE 15% FOR POSTAGE AND HANDLING. INSURANCE RATES ARE 30¢ FOR ORDERS UNDER $50.00. TEXAS RESIDENTS ADD 5% STATE SALES TAX.

MINIMUM ORDER $3.00

CUSTOMER SATISFACTION GUARANTEED - If you are not satisfied with your order for any reason, tubes may be returned within ten days for refund or replacement with exception of tubes which are shorted or have open filaments. It will be assumed that returned tubes with open filaments or shorts were damaged in shipment. Shipping damage claims will be handled promptly through the post office on insured orders. PUETT ELECTRONICS assumes no liability for orders which are not insured, and no liability beyond that which is covered by postal insurance. ALL TUBES ARE THOROUGHLY TESTED ON A MUTUAL CONDUCTANCE TUBE CHECKER BEFORE SHIPMENT.

SCHEMATIC DIAGRAMS

WE CAN FURNISH SCHEMATIC DIAGRAMS AND TECHNICAL DATA ON ALMOST ANY RADIO FROM 1920 TO 1954 FROM OUR LIBRARY OF ORIGINAL MANUFACTURERS SERVICE DATA. Send a self-addressed stamped envelope and $1.50 per radio set. This offer is limited to five photocopied pages. If the data on your set exceeds five pages, we will send you a quote. State mfg. & model number.

THE CLASSIC RADIO NEWSLETTER
E.H. SCOTT & McMURDO SILVER:
Send a self-addressed stamped envelope for a sample.

Send 91¢ in stamps for our new 6 to 8 page classic radio literature list. We sell, buy and trade classic radio literature on Scott & McMurdo Silver.

TYPES 01A, 99, WD-11, etc.
We sometimes have these tubes in stock in very limited quantities. Send a self-addressed stamped envelope for information.

BALLAST TUBES - We can supply many types of ballast tubes or their equivalents. Send a self-addressed stamped envelope with your inquiry.

OLD RADIO TECHNICAL BOOKS - Send SEND FOR OUR COMPLETE CATALOG (see information at foot of page)

TABLE - OLDER TYPE-NUMBER TUBES Prices listed for new tubes. Used tubes are half new tube price.

0A2	$2.	1LE3	$4.	5Y4	$3.	6F6	$3.	6U7	$4.	7Z4	$3.	14B5	$3.	35W4	$2.	81	$6.	5654	$2.
0A3	$2.	1LF3	$4.	5Z3	$3.	6F7	$6.	6V6	$2.	10	$6.	14B6	$3.	35Y4	$3.	82	$3.	5686	$3.
0A4	$2.	1LQ5	$4.	5Z4	$3.	6F8	$7.	6V7	$4.	12A5	$4.	14B8	$3.	35Z3	$3.	83	$3.	5691	$3.
0B3	$2.	1LH4	$4.	6A3	$5.	6G5	$4.	6W6	$3.	12A6	$3.	14C5	$3.	35Z4	$3.	83V	$3.	5703	$3.
0C3	$2.	1LN5	$4.	6A4	$6.	6G6	$3.	6X4	$2	12A7	$4.	14C7	$3.	35Z5	$3.	84	$3.	5749	$2.
0D3	$2.	1N5	$4.	6A5	$4.	6H6	$2.	6X5	$2.	12A8	$3.	14E6	$3.	35Z6	$3.	85	$3.	5751	$2.
0Y4	$3.	1N6	$4.	6A6	$4.	6J5	$3.	6Y5	$3.	12AH7	$3.	14E7	$3.	36	$3.	89	$3.	5814	$2.
0Z4	$2.	1P5	$4.	6A7	$5.	6J6	$2.	6Y6	$2.	12AT6	$2.	14F7	$3.	37	$3.	117L7	$4.	5879	$2.
1A1	$5	1Q5	$4.	6A8	$3.	6J7	$3.	6Y7	$2.	12AT7	$2.	14F8	$3.	38	$3.	117M7	$4.	5881	$2.
1A3	$3.	1R5	$2.	6AB4	$3.	6J8	$3.	6Z4	$3.	12AU6	$2.	14H7	$3.	39	$3.	117N7	$7.	5992	$2.
1A4	$3.	1S4	$2.	6AB7	$3.	6K5	$3.	6Z5	$2.	12AU7	$2.	14J7	$3.	40	$6.	117P7	$7.	6080	$3.
1A5	$3.	1S5	$2.	6AC5	$3.	6K6	$3.	6Z7	$2.	12AV6	$2.	14N7	$3.	40Z5	$2.	117Z3	$4.	6146	$4.
1A6	$3.	1T4	$3.	6AC7	$3.	6K7	$3.	6ZY5	$3.	12AX7	$2.	14Q7	$3.	41	$3.	117Z4	$4.	6138	$3.
1A7	$3.	1T5	$3.	6AG7	$3.	6K8	$3.	7A4	$3.	12B7	$3.	14R7	$3.	42	$3.	117Z6	$4.	6842	$2.
1B4	$3.	1U4	$3.	6AK5	$2.	6L5	$4.	7A5	$3.	12B8	$4.	14W7	$3.	43	$3.	485	$4.	6973	$2.
1B5	$3.	1U5	$3.	6AK6	$2.	6L6	$3.	7A6	$3.	12BA6	$2.	14X7	$3.	44	$3.	807	$4.	7025	$2.
1B7	$3.	1V	$4.	6AL5	$3.	6L7	$3.	7A7	$3.	12BE6	$2.	15	$5.	45	$5.	809	$6.	7193	$2.
1B8	$3.	2A3	$6.	6AL7	$4.	6N5	$4.	7A8	$4.	12C5	$3.	19	$4.	45Z3	$2.	837	$4.	9002	$3.
1C1	$4.	2A4	$5.	6AQ5	$2.	6N6	$3.	7AE7	$4.	12C8	$3.	19T8	$2.	45Z5	$2.	843	$3.	9003	$3.
1C5	$3.	2A5	$4.	6AQ7	$4.	6N7	$3.	7AF7	$4.	12F5	$3.	22	$5.	46	$6.	879	$2.	9004	$4.
1C6	$3.	2A6	$3.	6AS7	$3.	6P5	$3.	7AG7	$4.	12H6	$3.	24A	$3.	47	$5.	884	$7.	VR-	
1C7	$5.	2A7	$5.	6AT6	$2.	6Q7	$3.	7B4	$3.	12J5	$3.	25A6	$3.	48	$4.	923	$3.	90	$2.
1D5	$5.	2B7	$3.	6AU6	$2.	6R7	$4.	7B5	$3.	12J7	$3.	25A7	$3.	49	$4.	930	$3.	VR-	
1D7	$5.	2C26	$2.	6AV5	$2.	6S4	$4.	7B6	$3.	12K7	$3.	25AC5	$3.	50	$6.	950	$3.	105	$2.
1D8	$4.	2E5	$4.	6AV6	$2.	6S8	$3.	7B7	$3.	12K8	$3.	25B6	$3.	50A5	$3.	951	$3.	VR-	
1D21	$3.	2E30	$2.	6AX5	$2.	6SA7	$2.	7B8	$3.	12L6	$2.	25C6	$2.	50B5	$2.	955	$4.	150	$2.
1E5	$5.	2V3	$4.	6B4	$5.	6SB7	$3.	7C5	$3.	12Q7	$3.	25L6	$3.	50C5	$2.	958	$4.	VT-	
1E7	$4.	2W3	$4.	6B5	$5.	6SC7	$3.	7C6	$3.	12S8	$3.	25S	$3.	50C6	$3.	1005	$3.	52	$4.
1F4	$4.	2X2	$2.	6B6	$5.	6SD7	$3.	7C7	$3.	12SA7	$3.	25Z5	$3.	50L6	$3.	E1148	$2.	XXB	$3.
1F5	$4.	3A4	$3.	6B7	$5.	6SF5	$3.	7E6	$3.	12SC7	$3.	25Z6	$3.	50X6	$3.	1201	$3.	XXFM	$3.
1F6	$4.	3A5	$3.	6B8	$3.	6SF7	$3.	7E7	$3.	12SF5	$3.	26	$4.	50Y7	$3.	1203	$3.	XXL	$3.
1F7	$5.	3A8	$3.	6BA6	$2.	6SG7	$3.	7F7	$4.	12SF7	$3.	26A6	$4.	51	$3.	1232	$3.		
1G4	$4.	3C6	$3.	6BE6	$3.	6SH7	$3.	7F8	$4.	12SG7	$3.	26A7	$4.	53	$5.	1273	$3.		
1G5	$4.	3LF4	$5.	6BJ6	$2.	6SJ7	$3.	7G7	$3.	12SH7	$3.	27	$3.	55	$4.	1612	$3.		
1G6	$4.	3Q4	$3.	6C4	$2.	6SK7	$3.	7H7	$3.	12SJ7	$3.	28D7	$3.	56	$3.	1620	$3.		
1H4	$5.	3Q5	$3.	6C5	$3.	6SL7	$3.	7J7	$3.	12SK7	$3.	30	$3.	57	$3.	1625	$4.		
1H5	$3.	3S4	$2.	6C6	$3.	6SN7	$2.	7K7	$3.	12SL7	$3.	31	$3.	58	$3.	1626	$3.		
1H6	$3.	3V4	$2.	6C7	$4.	6SQ7	$3.	7L7	$3.	12SN7	$3.	32	$3.	59	$4.	1629	$4.		
1J6	$4.	5AZ4	$4.	6C8	$4.	6SR7	$3.	7N7	$4.	12SQ7	$3.	32L6	$3.	70A7	$3.	1633	$3.		
1L4	$4.	5R4	$2.	6CB6	$2.	6SS7	$3.	7Q7	$3.	12SR7	$3.	32L7	$3.	70L7	$3.	1634	$3.		
1L5	$6	5T4	$2.	6D6	$4.	6ST7	$3.	7R7	$3.	12V6	$3.	33	$3.	71A	$6.	1635	$3.		
1LA4	$4.	5U4	$2.	6D7	$4.	6SU7	$3.	7S7	$3.	12W6	$3.	34	$3.	75	$3.	1656	$3.		
1LA6	$4.	5V4	$2.	6D8	$4.	6SV7	$3.	7V7	$3.	12X4	$2.	35	$3.	76	$3.	1852	$3.		
1LB4	$4.	5V6	$2.	6E5	$4.	6T7	$4.	7W7	$3.	12Z3	$2.	35A5	$4.	77	$3.	1853	$3.		
1LC5	$5.	5W4	$2.	6E6	$4.	6T8	$2.	7X6	$3.	14A4	$3.	35B5	$2.	78	$3.	2050	$3.		
1LC6	$4.	5X4	$3.	6E7	$4.	6U5	$4.	7X7	$3.	14A5	$3.	35C5	$2.	79	$3.	2051	$3.		
1LD5	$4.	5Y3	$3.	6F5	$3.	6U6	$3.	7Y4	$3.	14A7	$3.	35L6	$3.	80	$3.	CK108	$3.		

COMPLETE CATALOG -- INCLUDES 10% DISCOUNT COUPON ON YOUR NEXT ORDER

SEND 52¢ IN STAMPS PLUS A SELF-ADDRESSED STAMPED ENVELOPE FOR OUR COMPLETE CATALOG. IN ADDITION TO TUBES AND SCHEMATIC DIAGRAMS, WE CAN ALSO SUPPLY KNOBS, DIAL ESCUTCHEONS, TUNING DRIVE BELTS, ANTIQUE TUBE CARTONS, OLD-STYLE GLASS ENVELOPE TUBES, SPECIAL TUBES FOR TUBE COLLECTORS, ANTIQUE WIRE, MORE RECENT TYPE-NUMBER AND TV TUBES, SPECIAL MAINTENANCE AND SERVICE NOTES ON SPECIFIC RADIO SETS, ANTIQUE RECORD CHANGER DATA, ANTIQUE PA SYSTEM DATA AND SCHEMATICS, OLD STYLE TUBE SHIELDS, AND SOME ORIGINAL PARTS FOR SETS.

IF YOU DO NOT SEE A TUBE WHICH YOU SEEK LISTED, SEND A SELF-ADDRESSED STAMPED ENVELOPE. WE MAY BE ABLE TO RECOMMEND A SOURCE OF SUPPLY.

MILITARY TYPE (VT) AND EQUIVALENT COMMERCIAL-TYPE TUBE CROSS-REFERENCE LIST
Send $1.00 plus a self-addressed stamped envelope.

We offer free technical advice for a self-addressed stamped envelope or you may call J.W.F. Puett at 214 - 279-8309 NO LATER THAN 10:00 PM CENTRAL STANDARD TIME OR CENTRAL STANDARD DAYLIGHT TIME (when applicable) PLEASE.

OUR NEW ACQUISITIONS LIST CONTAINS TEST GEAR, SPECIAL TUBES & TIME TO TIME RADIO SETS. AVAILABLE FOR A SELF ADDRESSED STAMPED ENVELOPE.

NEW MAJESTIC TUBES:

GLS	$5.
2A6	$4.
2B7	$3.
G31	$4.
6C7	$4.
6D7	$4.
6E7	$4.
46B1	$5.
G46A1S	$5.
G6Z5	$3.

We have many others used & new such as WE-205D at $6. Send 52¢ for our catalog. Collectors items - brass base 872A at $7.

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FEBRUARY

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Mr. Art B. Corbus
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